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EXAMINER

RYMAN, DANIEL J

ART UNIT

PAPER NUMBER

2616

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/932,294

Applicant(s)

KHOSRAVI ET AL.

Examiner

Daniel J. Ryman

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 11, 12 and 14-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11, 12 and 14-30 is/are rejected.
- 7) ☒ Claim(s) 6, 11, 12, 14, 15, 19 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-8 and 16-30 have been considered but are moot in view of the new ground(s) of rejection.
2. The indicated allowability of claims 11, 12, 14, and 15 is withdrawn in view of the newly discovered reference(s) to Prince et al. (USPN 5,852,606). Rejections based on the newly cited reference(s) follow.

Claim Objections

3. Claims 6, 14, 15, and 19 are objected to because of the following informalities: in the preamble of these claims the "capable of" language should be deleted since "capable of" does not require the subsequent limitation. MPEP § 2106(II)(C). Appropriate correction is required.
4. Claims 11 and 12 are objected to because of the following informalities: in line 1 "to calculate of" should be "to calculate". Appropriate correction is required.
5. Claim 22 is objected to because of the following informalities: in line 3 "rout" should be "route"; in line 3, "table to contain" should be "table containing"; and in line 5, "elements to contain" should be "elements containing". Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claims 4, 5, 7, 8, and 16-18 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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8. Regarding claims 4 and 7, claims 4 and 7 require that the packet be forwarded out of an egress port in the *ingress-forwarding element*. Claims 1 and 6, which claims 4 and 7 depend upon, respectively, require that various steps be performed “before the packet is transferred to a switched interconnect/backplane of the router.” It is unclear how a packet will be sent to a switched interconnect/backplane of the router if the packet is forwarded out of the ingress-forwarding element since, in this case, the ingress-forwarding element both receives and transmits the packet such that there is no need for the packet to be transmitted to the switched interconnect/backplane.

9. Regarding claims 5 and 8, claims 5 and 8 require that the packet is forwarded “to an egress-forwarding element through an internal bus of the router.” Claims 1 and 6, which claims 5 and 8 depend upon, respectively, require that the packet be transferred using “a switched interconnect/backplane.” It is unclear whether the “internal bus” is the same as the “switched interconnect/backplane” of claims 1 and 6. This is especially confusing since Applicant distinguishes between a bus and a switched interconnect/backplane in claims 16 and 19 by requiring “the transfer connection is selected from the group consisting of a single bus, and a switched interconnect/backplane.”

10. Regarding claims 16-18, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by “such as” and then narrow language. The

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Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 16 recites the broad recitation "transfer connection is selected from the group consisting of a single bus, and a switched backplane/interconnect", and the claim also recites "transferring the packet . . . via the switched backplane/interconnect" which is the narrower statement of the range/limitation. Applicant should amend the "switched backplane/interconnect" language in lines 10-12 of claim 16 to "transfer connection." Applicant should use claim 19 as a template since claim 19 is similar to claim 16 and it uses the "transfer connection" language.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 16-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Prince et al. (USPN 5,852,606).

13. Regarding claims 16 and 19, Prince discloses a method to switch at least one internal packet comprising: applying a switch-label (routing tag) to at least one packet, wherein the switch-label is generated upon receipt of the packet (col. 13, lines 42-46 and col. 14, lines 57-59), wherein the switch-label uniquely identifies an address within a router in which the address

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is an address of a port/next-hop on an egress-forwarding element within the router (col. 14, lines 57-64), wherein the egress-forwarding element is one of a plurality of forwarding elements within the router (Fig. 3 and col. 9, lines 29-38), wherein the forwarding elements are operably coupled to each other through a transfer connection (Fig. 3 and col. 9, lines 29-38); and wherein the transfer connection is selected from the group consisting of a single bus, and a switched backplane/interconnect (Fig. 3 and col. 9, lines 29-38); and transferring the packet between the plurality of forwarding elements via the transfer connection, wherein the switch-label is applied to the packet before the packet is transferred to the transfer connection (col. 14, lines 57-64).

14. Regarding claims 17 and 20, Prince discloses that the applying is performed by an ingress forwarding element (col. 14, lines 57-64).

15. Regarding claims 18 and 21, Prince discloses receiving the packet (col. 14, lines 39-64); removing the switch-label from the packet (col. 14, lines 39-64) where it is inherent that the switch-label is removed; completing layer-2 encapsulation (assembling the Ethernet packet) of the packet in reference to an external network (col. 14, lines 39-64); and transmitting the packet, wherein the receiving, the removing, the completing and the transmitting are performed by an egress-FE (col. 14, lines 39-64).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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17. Claims are 1-4, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Prince et al. (USPN 5,852,606).

18. Regarding claims 1 and 6, Applicant admits as prior art a method comprising: validating a header of a packet from a first checksum of the packet (page 2, lines 7-10); decrementing a time-to-live field of the header (page 2, lines 7-10); recalculating the checksum of the header (page 2, lines 7-10); performing a route lookup (page 2, lines 1-10); and forwarding the packet in reference to the egress-port of the packet (page 2, lines 1-19), wherein the validating action, the decrementing action, the recalculating action, and the route look-up are performed before the packet is transferred to a switched interconnect/backplane of the router (page 2, lines 1-19) where these steps are performed by the ingress element before the packet is passed to the switched interconnect/backplane in addition to by the other elements the packet passes through on its way to the egress port.

Applicant does not disclose as prior art that the validating action, the decrementing action, the recalculating action, and the route look-up are performed only once for the packet during transfer among a plurality of ports within a router. Prince teaches, in a modular routing system (col. 9, line 29-col. 10, line 21), using a routing tag to permit a packet to be switched through the switch fabric while only performing routing and other association operations once on the packet (col. 6, lines 19-27; col. 13, lines 42-57; and col. 14, lines 57-64). This is done in order to minimize the processing required for a packet which yields switching at high speed (col. 4, lines 9-13). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the routing tag concept of Prince in the system outlined in Applicant's admitted prior art to yield a system in which the validating action, the decrementing action, the

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recalculating action, and the route look-up are performed only once for the packet during transfer among a plurality of ports within a router. One of ordinary skill in the art at the time of the invention would have been motivated to do this in order to minimize the processing required for a packet which yields switching at high speed.

19. Regarding claim 2, AAPA in view of Prince discloses that the performing a route lookup further comprises: determining a next-hop (AAPA: page 2, lines 1-19 and Prince: col. 14, lines 57-64); and determining an egress-port (AAPA: page 2, lines 1-19 and Prince: col. 14, lines 57-64).

20. Regarding claim 3, AAPA in view of Prince discloses that the forwarding further comprises: forwarding the packet in reference to the egress-port (AAPA: page 2, lines 1-19 and Prince: col. 14, lines 57-64).

21. Regarding claims 4 and 7, AAPA in view of Prince discloses that the egress-port further comprises a local port on the ingress-forwarding element (Prince: col. 9, lines 29-56 and col. 14, lines 40-50), and the forwarding further comprises: completing the encapsulation of the packet (Prince: col. 7, lines 5-11 where a packet is encapsulated as an Ethernet packet before transmission); and transmitting the packet over the local-egress-port (Prince: col. 7, lines 5-11; col. 9, lines 29-56; and col. 14, lines 40-50).

22. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Prince et al. (USPN 5,852,606) in further view of Andersson et al. (USPN 6,449,275), of record.

23. Regarding claims 5 and 8, AAPA in view of Prince discloses that the egress-port further comprises a remote port (AAPA: page 2, lines 1-19 and Prince: col. 14, lines 57-64), and the

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forwarding further comprises: forwarding the packet to the egress-forwarding element through an internal bus (backplane) of the router (AAPA: page 2, lines 1-19 and Prince: col. 9, lines 29-38); applying a label (routing tag) that corresponds to the egress-port and next hop (Prince: col. 14, lines 57-64); removing the label (Prince: col. 14, lines 57-64 where it is implicit that the label is removed); completing the layer-2 encapsulation (construct ethernet packet) of the packet (Prince: col. 14, lines 39-67); and transmitting the packet over the egress-port (Prince: col. 14, lines 39-67 where it is implicit that the packet is transmitted).

AAPA in view of Prince does not expressly disclose determining the next hop and the egress-port on which the packet is to be transmitted in reference to the switch-label. However, AAPA in view of Prince does disclose that the look-up table is only consulted once during a packet's transit through a router (Prince: col. 7, lines 30-34). Andersson teaches, in a modular router, using a switch-label to determine the next hop and the egress-port on which the packet is to be transmitted (col. 2, line 66-col. 3, line 15) in order to reduce the number of internal control paths (col. 3, lines 60-63). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to determine the next hop and the egress-port on which the packet is to be transmitted in reference to the switch-label in order to reduce the number of internal control paths.

24. Claims 11, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prince et al. (USPN 5,852,606) in view of Jennings et al. (USPN 6,807,175).

25. Regarding claims 11, 12, 14, and 15, Prince discloses a method to calculate a routing table comprising: determining the routing table from at least one routing update message (col. 6, lines 6-11).

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26. Prince does not expressly disclose altering the routing table for each of a plurality of forwarding elements in the router in reference to presence of an egress-port in the forwarding element; adding a switch-label corresponding to an actual egress interface to the table, when an egress-port is not present in the forwarding element, wherein the switch-label is unique for every port/next-hop pair on the router; and performing no altering of the routing table for a forwarding element, when an egress-port is present in the forwarding element. However, Prince does disclose that switch labels (routing tags) are only used when the egress-port is not present in the forwarding element such that they are not used when the egress-port is on the forwarding element (col. 14, lines 40-45). In addition, Prince discloses that each forwarding element has a routing table (col. 9, line 57-col. 10, line 8) and that this table is updated (col. 6, lines 6-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to altering the routing table for each of a plurality of forwarding elements in the router in reference to presence of an egress-port in the forwarding element by adding a switch-label corresponding to an actual egress interface to the table, when an egress-port is not present in the forwarding element, wherein the switch-label is unique for every port/next-hop pair on the router and by performing no altering of the routing table for a forwarding element, when an egress-port is present in the forwarding element in order to ensure that the routing table reflects the updated list of routing tags.

27. Claims 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Andersson et al. (USPN 6,449,275), of record.

28. Regarding claims 22 and 25, Applicant admits as prior art a system comprising: a plurality of forwarding elements coupled to a switched interconnect/backplane (page 1, line 17-

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page 2, line 25), each of the forwarding elements to maintain a route lookup table to contain addresses associated with the packets entering the forwarding elements (page 1, line 17-page 2, line 25), and a control element operably coupled to the plurality of forwarding elements (page 1, line 17-page 2, line 25).

Applicant does not admit as prior art a switch-label entry table in each of the forwarding elements containing labels associated with the packets transferred internally among the forwarding elements via the switched interconnect/backplane, wherein the labels associated with the packets are generated before the packets are transferred internally through the switched interconnect/backplane or a control element operably coupled through a switched interconnect/backplane to the plurality of forwarding elements further comprising a processor and software means operative on the processor for generating a switch-label table for each forwarding element. Andersson teaches, in a modular routing system, having a switch-label entry table in each of the forwarding elements containing labels associated with the packets transferred internally among the forwarding elements via the switched interconnect/backplane (col. 3, lines 17-38), wherein the labels associated with the packets are generated before the packets are transferred internally through the switched interconnect/backplane (col. 3, lines 17-38) in order to reduce the number of internal control paths required (col. 3, lines 60-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have a switch-label entry table in each of the forwarding elements containing labels associated with the packets transferred internally among the forwarding elements via the switched interconnect/backplane, wherein the labels associated with the packets are generated before the packets are transferred

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internally through the switched interconnect/backplane in order to reduce the number of internal control paths required.

In addition, Andersson teaches having a control element (connection setup manager) operably coupled through a switched interconnect/backplane to the plurality of forwarding elements (col. 3, lines 15-38) where the control element further comprises a processor and software means operative on the processor for generating a switch-label table for each forwarding element (col. 3, lines 15-38) in order to reduce the number of internal control paths required (col. 3, lines 60-63). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have a control element operably coupled through a switched interconnect/backplane to the plurality of forwarding elements further comprising a processor and software means operative on the processor for generating a switch-label table for each forwarding element in order to reduce the number of internal control paths required.

29. Regarding claims 23 and 26, AAPA in view of Andersson discloses that one of the forwarding elements further comprises an egress forwarding element and another one of the forwarding elements further comprises an ingress forwarding element (AAPA: page 1, line 17-page 2, line 25), which receives packets from an external networking environment (AAPA: page 1, line 17-page 2, line 25), generates a local switch-label and associates the switch label with the packet (Andersson: col. 3, lines 15-38), the ingress forwarding element further comprises a packet forwarding component that forwards the packet through the apparatus using the switch-label (Andersson: col. 3, lines 15-38).

30. Regarding claims 24, 27, and 28, AAPA in view of Andersson suggests that the ingress forwarding element further validates the packet header checksum, decrements the time-to-live

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indicator by one, and recalculates the header checksum (AAPA: page 1, line 17-page 2, line 25 where it is implicit that the TTL is decremented by one).

31. Regarding claim 29, AAPA in view of Andersson discloses that the control element further comprises a route table manager that maintains a routing table (Andersson: col. 3, lines 15-38).


32. Regarding claim 30, AAPA in view of Andersson discloses that the apparatus is a router (AAPA: page 1, line 17-page 2, line 25).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Ryman whose telephone number is (571)272-3152. The examiner can normally be reached on Mon.-Fri. 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571)272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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